Natural Range of Variation

Patch Sizes & Landscape Desired Conditions

Recent science is using a concept called the Natural Range of Variation (NRV) to describe the natural processes that occur on the landscape from various ecological factors (Bollenbacher et al. 2016). This concept was used to develop and analyze the new Nez Perce-Clearwater National Forests Plan (Probert 2017). Components that influence the NRV are species composition, vegetation structure and disturbance patch sizes.

Species composition and vegetation structure can be grouped into potential vegetation types (PVTs) for broad-level analysis and monitoring at the landscape scale. These broad potential vegetation types combine habitat types that share similar biophysical characteristics such as slope, climate and soils and were used as a basis for analyzing ecological conditions at the forestwide scale (USDA 2019). PVTs found across the forest fall into four vegetation types for forested vegetation: warm-dry, warm moist, cool-moist and cold (as described in Milburn et al. 2015).

The Green Horse project area is within the Idaho Batholith and the majority of habitat types are within the warm moist and warm dry PVTs, with approx. 92 acres in the cool moist. The PVT within each opening does vary as NEPA units cover various aspects and elevations, which influences habitat type. At least 2 openings have two or more PVT's within the opening being requested – unit numbers 17 and 23.

In the forest plan revision process, desired conditions for species composition by PVT were developed based on the historic range of variation and the possibility of warmer, drier future conditions (Probert 2017, Shantz 2015). **Table 1** shows the desired species composition at the forest level, by PVT, along with current conditions across the Green Horse Project (9, 545 acres total).

Table 1. Desired and existing species composition across the project for all PVT's within the Green Horse Project Area. The entire project area was considered for a broader look at the landscape scale. Total percentages do not add up to 100% due to exclusion of non-forested areas and areas in the sapling stage.

Species	Desired Range*			Existing Condition**		
	Warm Moist	***Warm Dry***	***Cool Moist***	***Warm Moist***	***Warm Dry***	***Cool Moist***
Ponderosa pine	10-20%	50-60%	0%	0%	0%	0%
Douglas-fir	2-5%	15-20%	5-10%	9%	7%	4%
Lodgepole pine	5-10%	15-20%	25-35%	2%	2%	0%
Western larch	15-30%	1-2%	10-20%	0%	0%	0%
Grand fir / western redcedar***	10-20%	2-10%	1%	73%	78%	70%
Subalpine fir / Spruce	1-2%	0%	15-35%	11%	0%	6%

*Desired range comes from Forest Plan Revision DEIS desired conditions for MA3 (USDA 2019), which is comparable to current forest plan MA's with timber as a primary or secondary management goal.
**Existing condition comes from R1 VMap and stand exam data (R1 VMap and FS Veg merge).
***Includes grand fir and grand fir/shade-tolerant mix along with western redcedar. Western redcedar makes up less than 9% of existing conditions.

Decreasing the overall amount of grand fir/ grand fir mix will trend the project area toward desired conditions at the landscape level. There are also some opportunities to add western larch and increase lodgepole pine. Ponderosa pine will be evaluated on a site-specific basis as elevation, aspect and slope will play a part in site suitability. Opportunities to increase Douglas-fir will be limited to areas that are not showing signs of root disease, as Douglas-fir is highly susceptible to several different types of root disease.

Patch sizes vary across the landscape and change across habitat types, terrain and historical fire regimes. As part of the forest plan revision process, a patch analysis was done to determine the natural range of variation on patch sizes for the Nez Perce-Clearwater National Forests. Patch sizes varied by PVT, however, existing patches at the forestwide scale are smaller than the NRV. Average patch sizes across all broad PVT groups was found to be 375 acres. Patch size is further broken down into minimum and maximum sizes for each broad PVT, with warm dry PVT's having smaller patch sizes and cool moist PVT's having larger patch sizes to represent the large, stand-replacing fires associated with that fire regime (USDA 2019).

Warm moist PVTs have an average patch size of 87 acres with a maximum of 225 acres (USDA 2019, Appendix B). Warm dry PVTs have an average patch size of 57 acres with a maximum of 108 acres (**Table 2**). In the Selway and Middle Fork Clearwater River SubBasin Assessment (USDA 2001) it lists historic patch sizes across the landscape as 15 acres for open canopy stands and an average of 1,558 acres for closed canopy stands. Some of these patch sizes are larger than the current direction (Forest Service Manual 2470, Region 1 Supplement #R1 2400-2016-1, Section 2471.1) that states that the size of openings created by even-aged silvicultural treatments in the Northern Rockies will normally be 40 acres or less. Continuing to manage an area using openings smaller than historical patch sizes can result in fragmentation and the inability to manage for desired species composition, such as maintaining early seral species on the landscape (Schantz 2015, USDA 2019).

Table 2. Natural Range of Variation in patch size distribution (in acres) for the Nez Perce-Clearwater National Forests. From Appendix B of the Nez Perce-Clearwater Forest Plan draft environmental impact statement (DEIS). The average patch size, minimum and maximum are shown for all R1 Broad PVT types within units over 40 acres for the Green Horse Project.

	Warm Moist	Warm Dry	Cool Moist	Forest-Wide
Average	87	57	93	375
Minimum	29	29	25	76
Maximum	225	108	194	1,611

The Green Horse project proposes 10 openings greater than 40 acres that range from 47 acres to 406 acres (**Table 3**). The maximum possible opening being proposed (406 acres), does exceeds the average forest wide NRV. This large unit (NEPA unit 17) includes 73 acres of roadside-only treatment, which would be 150 ft on each side of the road, along with a 333-acre unit. Because the roadside treatment ends at the start of the 333-ac unit (i.e. a shared boundary line), the units are considered one NEPA unit for analysis purposes. Because of riparian corridors, leave patches and unharvestable ground, not all 406 acres of the unit will be harvested. Retention would be scattered throughout the unit in clumps, or in unharvested patches of various sizes from 1-3 trees to ¼ of an acre where feasible. Existing conditions within Unit 17

include armillaria root disease, dead lodgepole, dead and dying subalpine fir and large open brush patches.

Table 3. Proposed regeneration harvest units that are larger than 40 acres that may result in openings greater than 40 acres.

Opening No.	Unit No.	Acres
1	1	47
2	2	48
3	3	53
4	9	56
5	10	142
6	11	45
7	16	46
8	17	406
9	18	51
10	23	63

For this project, the openings larger than 40 acres are being proposed where treating a smaller area will not result in treating the extent of the root disease within the stand. See the Forested Vegetation section of the Green Horse Environmental Analysis, and the 200222GreenHorseScopingPackage for more information on the extent of root disease within the project area and the effects of root disease on stand productivity and forest health.

References

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